RESINOUS POLYMER CONTAINING WATERPROOFING PLASTER COMPOSITIONS

This application is a continuation-in-part of the now abandoned application Ser. No. 106,900, filed Jan. 15, 1971, which, in turn, is a continuation-in-part of application Ser. No. 727,037, filed on May 6, 1968, now abandoned.

The present invention relates to a composition and method for the integral waterproofing of plaster compositions and the like. More particularly, it relates to the incorporation of certain resinous polymers into plaster compositions in order to render them waterproof.

Plaster is a well known composition in the art; note, for example, the discussion in the Kirk-Othmer Encyclopedia of Chemical Technology, Vol. 3, 1949 (The Interscience Encyclopedia, Inc., New York), pages 441–445. A plaster is a mortar in which the binder is usually gypsum (various forms of calcium sulfate) or a mixture thereof with natural or Portland cement. Plaster compositions are widely used in the construction industry.

Plaster compositions up to the present time have had the disadvantage of having an affinity for moisture and this eventually leads to the disintegration of the plaster. With the rapid expansion of industrialized construction the need has arisen for perfectly shaped light-weight, fire resistant, high insulation units with varying rheological properties. To obtain these properties the plaster composition solids suitably comprise a cementitious form of calcium sulfate with non-cementitious fillers such as silicaceous aggregates, calciferous mineral powders, exfoliated mica, expanded clay, pumice, cork, all types of natural and synthetic fibers, including hessian fiber, polynosic and polyester fibers, nylon fibers, glass fibers, asbestos fibers and the like. The cementitious calcium sulfate includes, for example, anhydrous calcium sulfate, calcium sulfate, dihydrate and/or chemical gypsum, commonly called synthetic gypsum, as well as calcium sulfate hemihydrate.

In order to create a more rapid drying of the set plaster compositions under normal ambient conditions hydraulic cement can be added or used as a partial replacement for the plaster solids, as noted above. The cements which can be employed for this purpose are conventional hydraulic cements such as Portland cement; Ciment fondu; Roman cement, made by heating of a mixture of limestone and clay; Titan cement, made by fusing a mixture of Titaniferous iron ore, limestone and coke; Keene's cement, produced by the recalcination of calcined gypsum; and calcium aluminate cement, produced by heating a mixture of bauxite and limestone and Pozzolanic, a natural cement of volcanic origin. The term "cement" may be defined as a substance which, when mixed with a proportion of water, hydrates to form a hard tenacious mass. Various cement products are discussed in, for example, the Kirk-Othmer Encyclopedia cited above, Volume 3.

Conventional accelerators and retarding agents can be used to react with both the cement and the plaster solids if required, for example, potassium sulfate, sodium citrate, alum, calcium chloride, etc. If necessary, surface-active agents such as the alkyl-aryl sulfonates can be used for assisting the wetting-out of a surface if the plaster composition is to be applied in situ and to improve the wetting-out of the plaster composition solids during mixing. Other specific properties can be achieved by adding freeze resistant agents, antibacterial agents, natural and synthetic colloidal clays and the like to the composition. Furthermore, the set plaster compositions can be varied in density by adding foaming or de-foaming agents thereto.

It is clearly desirable for plaster compositions to have water-resistance properties because such properties widen the scope of application of such compositions, particularly when subjected to external weathering or when used as infill and cladding panels. Furthermore, water-resistant plasters can be reinforced with steel and various fabrics, which would otherwise be prone to rust or deteriorate when subjected to prolonged contact with moisture. Such reinforced plaster compositions then lend themselves to use as load-bearing units, which can be prestressed if desired. Normally, gypsum plasters lose up to twothirds of their compressive strength when wet, however, when waterproofed, little or no loss of strength occurs. For these reasons, a considerable amount of work has been previously carried out by other workers in attempts to develop plaster compositions which are waterproof but without notable success.

Accordingly, one of the objects of the present invention is to provide plaster compositions which are water-resistant and, thus possess a greater scope of applicability than the prior art compositions.

Another object of the invention is to provide a simple method for rendering plaster compositions, with or without additional fillers or additives, water-resistant without detracting from the desirable and beneficial properties thereof.

These and other objects and advantages of the present invention will become apparent to those skilled in the art from a consideration of the following specification and claims.

It has now been found, in accordance with the present invention, that a plaster or like composition can be given water-resistance properties by incorporating therein a resin and a solvent therefor. This can be achieved by including in the wetted-out plaster composition a solution of the resin in an organic solvent. In the preferred forms of the invention, an aqueous solution of a substituted cellulose derivative is also included in the composition as a suspending agent.

The resin solution can first be dispersed by mechanical means into the aqueous solution of the substituted cellulose, creating an emulsion, before incorporation into the plaster composition, or both solutions can be incorporated separately. The principal function of the substituted cellulose is to assist in keeping the resin solution in suspension while the plaster mix is in a fluid state and until it sets. The cellulose constituent also provides for improved adhesion to substrates and acts as a suction inhibitor when the plaster compositions are applied in situ; it has also been found to confer on the set plaster compositions a high degree of resistance to solvents, oils and greases. Substituted cellulose derivatives suitable as additives to the plaster compositions of this invention include carboxy ethers of cellulose and lower alkyl-substituted celluloses such as sodium carboxymethyl cellulose, hydroxypropyl cellulose, hydroxyethyl methyl cellulose, ethylhydroxyethyl cellulose and hydroxyethyl cellulose. Salts of carboxy ethers can only be used with lime-free compositions since insoluble calcium salts will be formed in the presence of lime.